Title: Assessing the impact of invasive woody plant species on shrubland birds in greatest need of conservation

Proposed Grant Period: 1 January 2016 – 31 December 2018

Amount Requested: $220,632

Project Partners: Illinois Natural History Survey, Illinois Department of Natural Resources

Key Habitat: Shrub/successional

(1) Need:

Background: The extent and quality of shrubland/successional habitat in Illinois is poorly understood. Consequently, little is known about the state of the shrubland fauna in Illinois. We do know, however, that with changing agricultural practices and the alteration of disturbance dynamics, such as fire return intervals, that shrubland species have undergone precipitous declines. Shrubland bird species are no exception. Breeding Bird Survey data indicates that in the last 50 years nearly twice as many shrubland species have declined compared to the number that have increased in the central United States (Sauer et al. 2008). In Illinois, the downward trend has been similar and may be even more dramatic. Over the last 100 years, shrubland bird species have declined more precipitously than even grassland species, while not receiving the same amount of conservation attention (Walk et al. 2010).

Invasive plant species encroachment into natural habitat can have wide ranging detrimental effects (Enserink 1999, Everett 2000). Invasive species may be particularly problematic in successional shrubland habitats (Hobbs and Huenneke 1992), which typically form on fallow lands or following major disturbance and are associated with high species turnover. The structural characteristics of invaded shrublands can vastly differ from shrublands dominated by native species. For birds in particular, invasive species can change the availability of safe nesting, foraging, and loafing areas. Consequently, highly invaded shrublands may not be of the same quality as shrublands dominated by native species, which may decrease shrubland bird abundance and diversity, or impact the physical health of birds utilizing shrublands.

Focal habitat: Shrubland habitats are uncommon and understudied in Illinois. Many species associated with this habitat are classified as Species in Greatest Need of Conservation (SGNC). Consequently, the Illinois State Wildlife Action Plan lists the maintenance and enhancement of shrub habitats in multiple Campaigns, and in the descriptions of Conservation Opportunity Areas across the state. However, managing shrublands requires an understanding of what constitutes quality, especially for wildlife species of concern. Although shrublands all share similar structural characteristics, the composition of the shrub community may play a large role in determining quality. Specifically, shrublands dominated by invasive species may be actively avoided, while others may act as ecological traps where species of concern suffer reduced fitness in habitat that appears suitable. Unfortunately, it is not economically or logistically feasible to remove all invasive species from all shrublands in Illinois. Consequently, we need to understand how non-native species impact SGNC, how that impact is related to the degree of invasive species encroachment, and how to best allocate limited resources to effectively control the

negative impacts of invasive plant species on SGNC. With this knowledge, the IDNR will be able to prioritize management on sites where invasive species control will be most beneficial and cost effective in the effort to protect SGNC.

Focal species: We will examine the shrubland nesting community in relation to invasive plant species encroachment and will prioritize efforts on three Species in Greatest Need of Conservation, the Yellow-breasted Chat (*Icteria virens*), Bell's Vireo (*Vireo bellii*), and Field Sparrow (*Spizella pusilla*). Yellow-breasted Chats use shrublands for food and nesting resources. During spring and summer their diet is primarily composed of insects and spiders (Bent 1953). They are categorized as obligate open-canopy nesting species in IL, and population density has been linked to shrub density (Crawford et al. 1981). Bell's Vireo utilizes shrubland habitats for breeding and foraging and are predominantly insectivorous. Bell's Vireo prefers shrub vegetation typically associated with early successional growth near riparian areas, brushy fields, and young second-growth forest (Kus et al. 2010). Presence of low lying shrub vegetation is a critical component in habitat selection by these birds (Goldwasser 1981). Field Sparrows prefer less dense vegetation for breeding in comparison to Yellow-breasted Chats and Bell's Vireos, yet utilize shrubland habitat on the edge of grassland areas. Field Sparrows nest low to the ground during the first part of breeding season and nest height increases as the vegetation height increases. They feed on small seeds and insects (Martin et al. 1951). By studying these three species, we will have a greater ability to understand how invasive plants are impacting populations of multiple SGNC, as well as avian community structure in these important shrubland habitats.

(2) Purpose and Objectives:

We will quantify the impacts of invasive plant species on the shrubland bird community and determine the relationship between invasive plant species and habitat quality for SGNC, to help inform management on the proper creation and enhancement of shrubland habitats. Specifically, we will address three Priority Conservation Actions identified in the Forest and Invasive Species Campaigns described in the State Wildlife Action Plan. 1) We will fill information gaps by determining how invasive species encroachment influences the shrubland bird community with special emphasis on three SGNC - the Yellow-breasted Chat, Bell's Vireo, and Field Sparrow. 2) We will determine the extent and condition of shrub/successional habitats by documenting invasive species encroachment and identifying site-level characteristics that may influence the footprint of invasive species. 3) We will evaluate unacceptable levels of invasive species encroachment and identify potential thresholds at which their abundance and distribution becomes detrimental to SGNC.

We will address the Priority Conservation Actions listed above by focusing on three specific objectives which will provide valuable information that can be used to prioritize targeted removal of specific invasive woody plant species, determine acceptable levels of invasive woody plant species encroachment, and identify specific shrublands and regions most in need of management. Specifically, we will:

(1) Identify site-level characteristics influencing the establishment and abundance of invasive woody plant species by examining invasive woody plant species composition at shrubland sites throughout the state of Illinois (>50).

(2) Determine the influence invasive woody plant species abundance has on the shrubland bird community by investigating how invasive woody plant species impact the presence and abundance of shrubland birds at shrubland sites throughout the state of Illinois (>50).

(3) Assess the impacts of invasive woody plant species abundance on the physiological condition of SGNC by investigating.

(3) Expected Results or Benefits:

Early successional-shrubland habitats and the species that depend on them are poorly understood and of special concern in Illinois. The results from this study will provide IDNR with high-resolution data on where and how shrubland habitats can be managed for the benefit of the avian community, with a special emphasis on SGNC. We will provide detailed records of bird and invasive woody plant species distributions and abundances in early successional/shrubland habitats throughout IL, as well as the physiological condition of three avian SGNC in relation to invasive woody plant species encroachment. We will determine which invasive woody plant species are most detrimental and should receive the most attention from land managers and large-scale cooperative efforts. Furthermore, we will assess what levels of invasive plant species encroachment is unacceptable, which could help prioritize management decisions and allocate limited resources and time. Finally, we will identify areas most threatened by invasive plant species encroachment. This information will help guide the creation, enhancement, and management of early successional/shrubland habitat in Illinois. The proposed research will allow management to focus on those sites most valuable yet most vulnerable, while targeting the invasive species that are most detrimental to shrubland bird species with a special emphasis on SGNC. Shrubland birds, by the very nature of their association with an ephemeral habitat, are highly exploratory and quickly take advantage of novel or improved habitat. Consequently, we believe that by understanding the role of invasive plant species we can rapidly improve the habitat we currently have to the benefit of shrubland bird species.

(4) Approach:

The work will be conducted by personnel with the Illinois Natural History Survey (INHS). This grant will provide funding for personnel, travel, and supplies. INHS scientists will oversee the project, help collect and analyze field data, and prepare reports. One graduate student will be funded for the three year duration of the project and will oversee the collection of field data, analyze data, and prepare reports. Student hourlies will assist in the collection of field data

We will conduct a three-year study focusing on the distribution of invasive woody plant species encroachment and its influence on the abundance and health of the shrubland bird community, with particular emphasis on three SGNC. We will take a hierarchical approach towards understanding this relationship by 1) identifying landscape and site-level patterns of occupancy and distribution of invasive woody plant species encroachment within shrublands across Illinois, 2) characterizing the bird communities of shrubland sites throughout Illinois, with special emphasis on three focal SGNC, and 3) investigating the physiological condition of adult SGNC at shrubland sites throughout Illinois.

Our approach will focus on publicly owned shrublands (N>50) where we will conduct multiple point and transect counts to identify the abundance of invasive woody plant species and the abundance and distribution of the avian community. Presence/absence data and information on species' density will be useful for assessing broad-scale patterns of invasive species

encroachment and its influence on the shrubland bird community. Additionally, targeted observation of focal SGNC will provide information on whether different sites meet minimum criteria for use by these birds. Finally, we will capture focal SGNC to determine physiological condition via glucocorticoid hormones, immune indices, and indices of diet quality, as well as assess parasite infection status for blood, ecto-, and intestinal parasites. Data will be analyzed using occupancy, n-mixture, and hierarchical models that account for uncertainty in our observations and incorporate landscape level and environmental covariates into our estimates.

Objective 1: Identify site-level characteristics influencing the establishment and spread of invasive woody plant species (30%)

Task 1.1: Identify shrubland sites in Illinois and characterize the woody vegetation.

1.1a) We will utilize aerial surveys and locations of publically owned lands in the state of Illinois to identify potential shrubland sites. 1.1b) We will utilize a stratified random selection process to select sites to visit from the list of potential sites, thereby ensuring geographic coverage of the state. Sites will be visited during the summer of 2016, 2017 and 2018 to verify the presence of shrubland habitat and to characterize the woody species community. 1.1c) Vegetation surveys will be conducted at each selected site to determine the woody plant species present and their abundances. We will survey of woody vegetation and will target all woody plants greater than 1m tall, and within 2m of a transect line that is 50m long; following protocols based on the Critical Trends Assessment Program (CTAP). 1.1d) We will create a map indicating the distribution of invasive woody species encroachment into shrubland areas throughout Illinois.

Task 1.2: Predict woody-species invasion into shrubland habitats.

1.2a) We will utilize data from the Critical Trends Assessment Program and data from our vegetation surveys to determine site- and landscape-level predictors of invasive woody plant species encroachment. 1.2b) We will build occupancy and n-mixture abundance models for invasive woody plant species to determine how geographic location (longitude and latitude), successional history (e.g. time since disturbance or cessation of agriculture), regional land cover, and human population density influence their presence and abundance. 1.2c) We will provide site-level information on the characteristics influencing invasive species encroachment that can be used to prioritize management.

Objective 2: Determine the influence invasive woody plant species encroachment has on the shrubland bird community (30%)

Task 2.1: Identify how the avian community changes in relation to invasive species encroachment

2.1a) We will conduct multiple point counts on all targeted shrubland sites. 2.1b) We will use a hierarchical community model to investigate how abundance and richness of the shrubland bird community changes with respect to invasive woody species encroachment, while accounting for imperfect detection. 2.1c) We will provide site-level information on how the avian community is influenced by invasive species encroachment, which can be used to prioritize management.

Task 2.2: Identify how Yellow-Breasted Chat, Bell's Vireo, and Field Sparrow are influenced by the presence of invasive woody species.

2.2a) We will conduct targeted transect counts using call-playback to identify the presence/absence and abundance of the three focal shrubland bird species. 2.2b) We will utilize n-mixture models to estimate abundance of the three focal species in relation to woody species encroachment, while accounting for imperfect detection. 2.2c) We will provide site-level information on how the three focal species are influenced by invasive species encroachment, information that can be used to prioritize management.

Objective 3: Assess short and long-term impacts of invasive woody species encroachment on the physiological condition of Species in Greatest Need of Conservation (40%)

We will examine multiple aspects of condition and health in at least two of the focal avian species to elucidate more subtle effects that changes in plant composition may have on the birds. These aspects of condition include assessing allostatic load (determined by examining stress burden), parasite infections, immune function, and dietary metabolites. Together, these parameters will provide a broad picture of short-term and long-term impacts that habitat quality may have on birds.

Task 3.1 Identify the physiological health of the Yellow-breasted Chat, Bell's Vireo, and Field Sparrow

3.1a) We will capture focal species at a subset of shrubland sites representing the spectrum of invasive species encroachment. 3.1b) We will assess allostatic load in the focal species. Allostatic load is a measure of the stress burden an organism builds up over time (McEwen and Wingfield 2003) and can be examined by measuring levels of circulating glucocorticoids, such as corticosterone, or levels of reactive oxygen species (free radicals). We will measure levels of corticosterone and/or reactive oxygen species to determine the stress burdens of the focal species. 3.1c) We will assess the parasite load of the focal species. Parasites are capable of substantially reducing host fitness (Combes 2001). We will assess natural parasite burden and diversity in the birds by examining ectoparasites and endoparasites. 3.1d) We will assess the immune function of the focal species. We will assess multiple aspects of the birds' immune system via bactericidal capacity, and white blood cell counts. The immune system is costly to develop and maintain, (Lochmiller & Deerenberg 2000), and resource availability and quality likely impact the ability of individuals to invest in defenses against parasites. 3.1e) We will assess dietary metabolites of the focal species. Food resources have obvious impacts on organism health and condition, but can be difficult to quantify. By examining dietary metabolites such as triglyceride or beta-hydroxybutyrate, we can assess the birds' diet quality. 3.1f) We will provide information on how invasive species encroachment influences the health of the three focal species, information that can be used to prioritize management.

(5) Useful Life: Not Applicable

(6) Geographic Location:

Early successional/shrubland habitats (>50) will be surveyed throughout the state of Illinois. Exact locations for woody species documentation, shrubland bird community surveys, and physiological health indices of SGNC will be determined via aerial photography and on-the-ground site visits.

(7) Principal Investigators:

Kirk Stodola
Illinois Natural History Survey
217/300-4003

David Zaya
Illinois Natural History Survey
217/244-1946

Loren Merrill
Illinois Natural History Survey
217/244-8187

T.J. Benson
Illinois Natural History Survey
217/265-6242

Stan McTaggert – IDNR Project Manager

(8) Program Income: Not Applicable

(9) Budget Narrative:

PROJECT BUDGET	Year 1			Year 2			Year 3			Project Total		
Expense Line Item	**Request**	**Match**	**Total**	**Request**	**Match**	**Total**	**Request**	**Match**	**Total**	**Request**	**Match**	**Total**
SALARIES & WAGES												
Professional	$15,499	$6,983	$22,482	$7,924	$6,833	$14,757	$8,155	$7,017	$15,172	$31,578	$20,833	$52,411
GRA - academic yr	$20,000		$20,000	$20,000		$20,000	$20,000		$20,000	$60,000	$0	$60,000
Student Hourly - full time student	$3,700		$3,700	$8,008		$8,008	$8,520		$8,520	$20,228	$0	$20,228
Non-student hourly			$0			$0			$0	$0	$0	$0
Total Salaries & Wages	**$39,199**	**$6,983**	**$46,182**	**$35,932**	**$6,833**	**$42,765**	**$36,675**	**$7,017**	**$43,692**	**$111,806**	**$20,833**	**$132,639**
FRINGE BENEFITS												
Professional @ 44.77%	$6,939	$3,126	$10,065	$3,548	$3,059	$6,607	$3,651	$3,142	$6,793	$14,137	$9,327	$23,464
GRA - ac yr @ 6.19%	$1,238	$0	$1,238	$1,238	$0	$1,238	$1,238	$0	$1,238	$3,714	$0	$3,714
GRA - summer (no classes) 13.84%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Student Hourly - part time 7.79%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Student Hourly - full time 0.14%	$5	$0	$5	$11	$0	$11	$12	$0	$12	$28	$0	$28
Non-student hourly @ 7.79%	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Total Fringe Benefits	**$8,182**	**$3,126**	**$11,308**	**$4,797**	**$3,059**	**$7,856**	**$4,900**	**$3,142**	**$8,042**	**$17,879**	**$9,327**	**$27,206**
Total Salaries, Wages, & Fringe Benefits	$47,381	$10,109	$57,490	$40,729	$9,892	$50,621	$41,575	$10,159	$51,734	$129,685	$30,160	$159,845
TRAVEL												
Out of state			$0			$0			$0	$0	$0	$0
In state	$13,000		$13,000	$14,000		$14,000	$15,000		$15,000	$42,000	$0	$42,000
Foreign			$0			$0			$0	$0	$0	$0
Total Travel	**$13,000**	**$0**	**$13,000**	**$14,000**	**$0**	**$14,000**	**$15,000**	**$0**	**$15,000**	**$42,000**	**$0**	**$42,000**
MATERIALS & SUPPLIES - General	$1,247		$1,247	$5,573		$5,573	$5,355		$5,355	$12,175	$0	$12,175
Publication Fees (reprints/page charges)			$0			$0			$0	$0	$0	$0
Total Materials & Supplies	**$1,247**	**$0**	**$1,247**	**$5,573**	**$0**	**$5,573**	**$5,355**	**$0**	**$5,355**	**$12,175**	**$0**	**$12,175**
CONTRACTUAL SERVICES - General			$0			$0			$0	$0	$0	$0
Each Subaward up to $25K			$0			$0			$0	$0	$0	$0
Exempt Subawards (>$25K)			$0			$0			$0	$0	$0	$0
Conference Registration Fees			$0			$0			$0	$0	$0	$0
Total Contractual Services	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**	**$0**
TELECOMMUNICATION SERVICES			$0			$0			$0	$0	$0	$0
EQUIPMENT (each item $5000+)			$0			$0			$0	$0	$0	$0
Total Direct Costs	$61,628	$10,109	$71,737	$60,302	$9,892	$70,194	$61,930	$10,159	$72,089	$183,860	$30,160	$214,020
Modified Total Direct Costs (MTDC)*	$61,628	$10,109	$71,737	$60,302	$9,892	$70,194	$61,930	$10,159	$72,089	$183,860	$30,160	$214,020
F&A (20% of MTDC)	$12,326		$12,326	$12,060		$12,060	$12,386		$12,386	$36,772		$36,772
F&A (58.6% MTDC)		$5,924	$5,924		$5,797	$5,797		$5,953	$5,953		$17,674	$17,674
Unrecovered F&A (20% vs. 58.6%)		$23,789	$23,789		$23,276	$23,276		$23,905	$23,905		$70,970	$70,970
Total Proposed Project Budget	**$73,954**	**$39,821**	**$113,775**	**$72,362**	**$38,965**	**$111,328**	**$74,316**	**$40,017**	**$114,333**	**$220,632**	**$118,804**	**$339,436**
	65.0000%	35.0000%		64.9993%	35.0007%		64.9996%	35.0004%		64.9996%	35.0004%	

* MTDC: less exemptions (equipment over $5,000, tuition remission, leases/rentals, and each subcontract in excess of $25K)

Budget Justification

Salaries, Wages, and Fringe Benefits:

The INHS salaries are outlined in the Approach Section of this document. In 2016, INHS scientists, Drs. David Zaya, Loren Merrill, Kirk Stodola, and T.J. Benson, are requesting approximately 16 weeks of funding to identify sites, conduct initial field surveys, train field technicians, analyze field data, and prepare reports. In 2017 and 2018, INHS scientists, Drs. David Zaya, Loren Merrill, Kirk Stodola, and T.J. Benson, expect to spend approximately six weeks collecting field data, analyzing data, and preparing reports. State-funded portions of INHS scientist salaries are being used as match. Specifically, Dr. T.J. Benson with INHS is offering 9.5% of his time in 2016, 9% of his time in 2017, and 9% of his time in 2018 in support of the project, helping to plan and coordinate field operations, analyze data, and prepare reports. One graduate student will be funded for the duration of the project. The graduate student will coordinate and oversee much of the daily field operations and be tasked with helping to analyze and prepare reports. Finally, one student hourly will be hired in 2016 and two student hourlies in 2017 and 2018 to help collect field data for 9 weeks over the timeframe listed in the Approach Section of this document.

Travel:

Travel is all in-state and is calculated using the following reimbursements, $28 per diem, $80 per night hotel rate, and $0.55 per mile traveled.

In 2016, we expect to spend 11 weeks in the field (one week preliminary surveys, 10 weeks for site visits and data collection). Ten of these weeks will have overnight travel for three people (INHS scientists, graduate student, field help), utilizing two hotel rooms for three nights per week. Total estimated per diem costs will be $3,360 and total estimated hotel costs will be $4,800. Travel per week (11 total) will average 400 miles per field team (plant and bird), with total mileage costs coming to $4840.

In 2017, we expect a 12 week field season (one week preliminary surveys, 11 weeks for site visits and data collection). Nine weeks will require overnight travel for four people (INHS scientists, graduate student, field help) utilizing two hotel rooms for three nights a week. Total estimated per diem costs will be $4,032 and total estimated hotel costs will be $4,320. Total mileage for the three weeks of day travel will be approximately 423 miles a week for a total of $698. Travel per week of overnight will average 500 miles per field team (plant and bird), with total mileage costs coming to $4,950.

In 2018, we expect to spend 13 weeks in the field with four people, utilizing two hotel rooms for three nights per week. Nine of the 13 weeks will require overnight travel. Total estimated per diem costs will be $4,032 and total estimated hotel costs will be $4,320. Total mileage per week during the nine weeks of overnight travel will average approximately 500 miles per field team (plant and bird), with total mileage costs coming to $4,950. Travel for two weeks of day travel will average 500 miles per field team (plant and bird), with total mileage costs coming to $1,100. Finally, two weeks of day travel will average 544 miles, with a total mileage cost of $598.

The preceding calculations will allow us to properly survey sites across the state for vegetation analyses, bird community assessment, and for travel to capture birds and collect samples.

Materials and Supplies:

Materials and Supplies in 2016 will be used to purchase typical field related items, compasses, measuring devices, identification books, clipboards, etc. Additional Materials and Supplies needed in 2017 and 2018 will be used for collecting and storing blood samples (e.g., needles, capillary tubes, coolers, lysis buffer, etc.) and running physiological and parasitological assays (e.g., reagents for DNA extraction, PCR, metabolite ELISAs, etc.).

Contractual Services: N/A

(10) Multipurpose Projects: Not Applicable

(11) Relationship to Other Grants:

Although this project focuses on birds in early successional habitats, the work is focused on different topics that W-181-R. More specifically, W-181-R focuses on identification of shrubland habitats using remote sensing to quantify the amount of shrubland habitat in Illinois, examining the process of shrubland creation, and bird responses, via natural successional processes on fallowed lands, and management practices for maintaining shrubland habitats via mechanical disturbances. Importantly, W-181-R focuses on structural aspects without reference to compositional aspects such as degree of dominance by invasive species. Nonetheless, some of the same personnel are involved in both the current project and W-181-R and both projects rely on the well-established infrastructure of the Illinois Natural History Survey.

(12) Timeline:

The following activities will be conducted during the approximate time frame:

Objective 1: Identifying site-level characteristics influencing the establishment and spread of invasive woody plant species, will occur from January 1, 2016 – December 31, 2018.

> January 1, 2016 – May 1, 2016: We will identify and select potential shrubland sites (tasks 1.1a, 1.1b).
>
> June 1– September 1, 2016, 2017, 2018: We will conduct vegetation surveys on selected shrubland sites (tasks 1.1b, 1.1c).
>
> December 31, 2018: We will provide a map and accompanying information on the distribution of invasive woody plant species on shrublands throughout Illinois (task 1.1d).
>
> December 31, 2018: We will provide site-level information on the characteristics influencing invasive species encroachment that can be used to prioritize management (tasks 1.2a, 1.2b, 1.2c).

Objective 2: Determining the influence that invasive woody plant species encroachment has on the avian shrubland community, will occur from June 1, 2016 – December 31, 2018.

> June 1 – July 31, 2016, 2017, 2018: We will conduct multiple point counts and transect counts on all targeted shrubland sites (tasks 2.1a, 2.2a).
>
> December 31, 2018: We will provide site-level information on how the avian community and SGNC are influenced by invasive species encroachment (tasks 2.1b, 2.1c, 2.2b, 2.2c).

Objective 3: Identifying the physiological health of Yellow-breasted Chat, Bell's Vireo, and Field Sparrow, will occur from June 1, 2017 – December 31, 2018.

May 15 – July 16, 2017, 2018: We will capture focal SGNC, collect blood samples, and other physiological measurements (tasks 3.1a, 3.1b, 3.1c, 3.1d).

August 1, 2017 – December 31, 2018: We will conduct laboratory work to assess stress burden, parasite levels, immune function, and dietary metabolites, in the focal SGNC (tasks 3.1b, 3.1c, 3.1d).

December 31, 2018: We will provide information on how invasive species encroachment influences the health of the three focal species

We will prepare a final SWG report by December 31, 2018

(13) General:

(i) Substantial in Character and Design

The project statement describes a need consistent with the Illinois State Wildlife Action Plan, states a purpose and sets objectives, both of which are based on the need, uses a planned approach, appropriate procedures, and accepted principles of fish and wildlife conservation and management and research and is cost effective.

(ii) Compliance:

The IDNR will use its CERP (Comprehensive Environmental Review Process) as a tool to aid the Department in meeting NEPA compliance for the project outlined under this grant proposal. It is the Department's policy to require CERP applications for all land disturbing activities unless those activities are covered by CERP exemptions.

All planned activities will also be in compliance with the Endangered Species Act. All determinations and documentation will be in accordance with the current established U.S. Fish and Wildlife Service protocols for section 7.

All planned activities will be in compliance with the National Historic Preservation Act and the Council on Historic Preservation Act. All determinations and documentation will be in accordance with the terms of the Programmatic Agreement, as amended, effective September 23, 2002.

When applicable, those planned activities which involve a floodplain and/or jurisdiction wetlands will be done in accordance with Presidential Executive Orders 11988 and 11990.

When applicable, those planned activities which involve programs and/or site improvements will be done in accordance with Section 504 of the Rehabilitation Act and the Americans with Disabilities Act.

When applicable, those planned activities which involve the use of pesticides, herbicides or other comparable chemicals will be done in accordance with current state and federal regulations to assure the safe and legal application of those chemicals. All chemicals will

be applied in accordance with the manufacturers label instructions. All persons applying chemicals will be licensed by the Illinois Department of Agriculture as a chemical operator along with a licensed applicator, in accordance with Illinois state law.

A federal banding permit is necessary to capture migratory songbirds. Dr. Merrill has a federal bird banding permit (#23469) and permission to capture and collect blood from the focal SGNC. In addition, Drs. Merrill and Benson have an active IACUC protocol that covers all tasks described under objective 3 and will amend that protocol to include the Yellow-breasted Chats and Bell's Vireo (Field Sparrows are already included).

Grant Proposal Support Documentation:

The following documents are attached in support of the proposal:

1. Application for Federal Assistance (Standard Form 424)
2. Federal Aid Section 7 Evaluation Form

References:

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